Claims

[1] A distribution and temporary storage system of transport units characterised in that it is formed by a matrix conveyor, so designated by being a ranked aggregation of individual movement cells (CMi), disposed in the form of matrix, and motorised from a centralised movement bus and set up thereon, capable of moving the transport units placed upon themselves to any one of its neighbouring cells in the matrix, being the system optionally supplemented with an overhead storage system of transport units formed by a set of overhead storage cells, with a mechanic retention device of the transport units of the type ' *press and hold - press and release* ', arranged in form of matrix over the CMis at a higher level and by a three-axis manipulator that carries out the transfer of transport units between the CMis and between those and the overhead storage system.

[2] The distribution and temporary storage system of transport units, according to claim 1, characterised in that it possesses association points, which constitute locations where a material lot is associated to a transport unit so that this set is recognised and treated by the system until the moment in which all the programmed operations to be carried out in the work stations are completed or, alternatively, there is a request to interrupt the programmed sequence; in this case, the transport unit will be able to proceed to a disassociation point where the inverse operation will take place.

[3] The distribution and temporary storage system of transport units, according to claim 1, characterised in that the Individual Movement Cells being formed by a set of parallel rollers, by two belts located in the gap between the rollers and arranged parallel thereto, set up over an elevating system which will position them below or above the rollers level, whether it is intended to move the transport unit placed on the cell perpendicular to the rollers or in the parallel direction; by a set of four bumpers/guides which can be operated individually, working as a guarantee of the correct route of a transport unit or of its stop, when its destiny is the current movement cell, and by an electro-pneumatic system which will make the coupling to an external motorised belts system which allow the rollers and belts movement mentioned above in the four possible orientations.

[4] The distribution and temporary storage system of transport units, according to claim 1, characterised in that the Centralised Movement Bus being formed by a motor and by a set of belts or chains arranged in form of a

matrix and that moves in orthogonal directions and in the four possible orientations.

[5] The distribution and temporary storage system of transport units, according to claims 1, 3 and 4, characterised in that the Centralised Movement Bus allowing the motorization of any individual movement cell when the same is set up over one of the elements of the movement matrix and the respective electro-pneumatic system is set in motion, making the coupling to one of the motorised belts, thereby transmitting movement to the rollers or belts of the movement cells.

[6] The distribution and temporary storage system of transport units, according to claims 1 and 3, characterised in that the Compound Movement Cells being formed by the ranked aggregation of four individual movement cells associated to a work station, in which each one of the individual cells has a distinct function:
E2 - waiting 2 - cell in which is placed a transport unit whose contents have an operation programmed to be carried out in the work station;
E1 - waiting 1 - cell where the transport unit coming from E2 - waiting 2 is displaced to when E1 is free;
T - work - cell where the transport unit is displaced to when T is free and where the operator of the work station accesses the contents in order to carry out the programmed operations;
AT - post work - cell where the transport unit is displaced to coming from T when the operations programmed to be carried out therein are already completed and AT is free.

[7] The distribution and temporary storage system of transport units, according to claims 1 and 6, characterised in that the movements in the Compound Movement Cells from E2 to E1, from E1 to T and from T to AT being automatically carried out by the control system when the necessary conditions occur, namely the destination cell being free and, in the case of T to AT, having finished the operations programmed to be carried out in the work station, being that in this latter case, the condition is fulfilled when the worker presses the pushbutton or, optionally, the control system gives the order as soon as the programmed time to carry out the operations in the work station has been reached.

[8] The distribution and temporary storage system of transport units, according to claims 1 and 6, characterised in the fact that in the Compound Movement Cells the worker is able to access the contents of the transport unit placed in E1 to carry out the programmed operations, when the

contents work of transport unit placed in T is completed and it cannot proceed to AT, since it is occupied, being possible thereby to postpone the blockage situation of the work station while the transport unit placed in AT is not removed.

[9] The distribution and temporary storage system of transport units, according to claims 1 and 3, characterised in that the simplified Compound Movement Cells being formed by a ranked aggregation of two individual movement cells associated to a work station, having each of the individual cells a distinct function:
E1 - waiting 1 - cell where a transport unit is placed and whose contents have an operation programmed to be carried out in the work station,
T - work - cell where the transport unit is displaced to when T is free and where the operator of the work station accesses the contents in order to carry out the operations programmed to be carried out therein.

[10] The distribution and temporary storage system of transport units, according to claims 1, 3 and 9 characterised by the fact that in the simplified Compound Movement Cells the movements from E1 to T are automatically carried out by the control system
when the necessary conditions occur, namely the destination cell being free, the worker signalling SIDAT's managing system when the programmed work is completed in the contents of the transport unit, or, alternatively, the system being able to consider the work completed at the end of a period of time programmed for the operations to be executed; in any case the system will remove the box from cell T to the adjacent Movement Cell in order to start the route to the CMc associated to the work stations where the next operation(s) will be carried out.

[11] The distribution and temporary storage system of transport units, according to claims 1 and 9 characterised by the fact that in the simplified Compound Movement Cells the worker is able to access the contents of the transport unit placed in E to carry out the programmed operations, when the work of the transport unit placed in T is completed and it cannot proceed to its next destination; it is possible thereby to postpone the blockage situation of the work station while the transport unit placed in T is not removed.

[12] The distribution and temporary storage system of transport units, according to claims 1, 3, 4, 6 and 9 characterised by the matrix conveyor being formed by any combination of movement cells, compounded and individuals, associated to a centralised movement bus, namely but not restrictively those presented in figures **8**, **9** and **10** and those additionally

described in the patent text.

[13] The distribution and temporary storage system of transport units, according to claim 1, characterised by the overhead storage cell is formed by a rectangular structure with a mechanic retention device of the type ' *press and hold - press and release* ', which allows to hold a transport unit when the same is elevated from an inferior level.

[14] The distribution and temporary storage system of transport units, according to claims 1 and 13, characterised by the storage cell transport unit retention system operates with mechanics binary logic, being that in a first drive it holds the transport unit and in the next drive it releases the transport unit.

[15] The distribution and temporary storage system of transport units, according to claims 1, 13 and 14 characterised by the Overhead Storage System being formed by an aggregated set of overhead storage cells, arranged in a matrix over the matrix conveyor, and by a three-axis manipulator which allows the transfer of transport units between the matrix conveyor cells and between those and the overhead storage cells.

[16] The distribution and temporary storage system of transport units, according to claim 1, characterised by the fact that it has a programme associated, based on a computer and/or a
programmable logic controller responsible for managing, monitoring, scheduling and balancing the system, taking into consideration the information of work to be carried out in the contents of each transport unit, namely in the operating routing, times, quantities and identification of article, being this information obtained in an association operation of the transport unit to its contents.

[17] The distribution and temporary storage system of transport units, according to claims 2 and 16, characterised by the management programme performing a dynamic management of the system in a multi-criteria approach, choosing at every moment which movements of the transport units to execute between movement cells or from these to the overhead storage system and vice-versa, taking into consideration the resources and the necessities, in order to guarantee, amongst others, null waiting times in the work stations, compliance of defined deadlines and absence of blockage in the work station.